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ABSTRACT

Facilitating Effective Learning and Teaching (FELT) is a program that involves the systematic analysis of learning by students. It identifies the processes of reflection and making implicit knowledge explicit in changing one's understanding of learning. The present investigation examines the prediction that students can enhance their self-perception and effectiveness as learners by understanding and valuing both the learning process and themselves as learners. The FELT program affords the opportunity for students to evaluate and to modify the concepts of learning in the light of increasing knowledge and experience as learners. The basis of the FELT program is an examination of the learning process by learners. The following aspects of the learning experience are examined: (1) the meaning of learning; (2) individual ways of learning; (3) feelings of the learner; (4) displaying knowledge; (5) learning new ideas; (6) concentrating; (7) learning by reading, writing, and listening; (8) remembering; (9) learning in different contexts; and (10) organizing. The FELT program is based on eight assumptions. One assumption of the FELT program is knowledge is acquired through active construction. An investigation of 137 students in grades 5-8 reports an evaluation of the effect of studying the first aspect of learning on students's knowledge of learning and beliefs about themselves as learners. (KDP)

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Students learning more about learning

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It is increasingly acknowledged that students, to be optimally effective in the next Century, need a knowledge of the processes associated with learning and change, as well as content knowledge. Incorporating an opportunity for this type of learning within regular teaching contexts has provided a challenge for schools and curriculum developers. Integrating this knowledge with learning in other areas and monitoring change in knowledge acquisition are frequently identified as problems. The present paper reports the development , use and trialling of an approach to learning that has been shown to achieve these goals.

The programme (Facilitating Effective Learning and Teaching or FELT), involves the systematic analysis of learning by students. It identifies the processes of reflection and making implicit knowledge explicit in changing one's understanding of learning. Students examine the models and beliefs they have about learning and how their beliefs influence how they learn. They explore their individual learning preferences and how these can be broadened. They examine the issue of displaying what they know, making opportunities for themselves to do this and strategies that they may use for this, practical strategies for changing their knowledge base and for building a repertoire of learning strategies including the process of making use of what they know when learning a new idea. The roles of attitudinal and affective influences on learning and the use of self-talk to manage negative emotional influences in learning are explored. Strategies for managing and enhancing attentional processes in learning, for remembering, and for learning by reading, writing and by listening are evaluated on a personal base. Students trial strategies for monitoring learning and compare individual, group and co-operative contexts for learning.

The paper reports changes in students' knowledge of learning and beliefs about learning and changes in the practical use and transfer of effective learning strategies at the primary and secondary school levels.

Students learning to understand how they learn and the nature of the learning process have been increasingly identified as major goals of contemporary school curricula (Hughes, 1993; Ruby & Dixon, 1993). Several of the key competencies for participation in work in the recent Mayer Report (Mayer, 1992) are of this ilk; collecting, analysing and organizing information, communicating ideas, planning, and solving problems. Approaches to putting in place in school curricula the means by which this knowledge may be acquired, are however, in their infancy. A major focus has been the teaching of a range of ways of learning, or learning strategies. Broadly referred to 'learning strategy instruction' (Ellis, Deschler, Lenz, Schumaker & Clark, 1991) thinking strategy instruction (Baron, 1987; French & Rhoder, 1992; Schriever, 1991)) 'metacognitive teaching' (Dembo, 1991; Scruggs, 1990), or 'cognitive strategy training', these instructional procedures have focused on assisting students to increase their repertoire of ways of thinking about ideas. The procedures differ in several implicit assumptions that they make about learning, for example, whether general purpose versus context specific strategies can be learnt, whether individual ways of learning influence the strategies learnt and whether affective variables influence substantially the learning of thinking strategies.

The procedures also differ in their success or effectiveness. While direct thinking strategy teaching has had some success , limitations have been noted, for example, the generalizability of the knowledge learnt , the extent to which it becomes integrated with knowledge in other areas and individual learner difference in the effectiveness of the teaching (for reviews see Edwards, 1991 or Polson & Jeffries, 1985). In many of the studies the assumptions made about learning and how learning occurs have not been explicated. There would seem to be a need for a teaching approach that takes account of student knowledge about learning at any time and simultaneously provides the opportunity for students to develop this further.

The present investigation examines the prediction that students can enhance their self-perception and effectiveness as learners by understanding and valuing both the learning process and themselves as learners. This

understanding is developed through the implementation of a programme that provides students with the opportunity to develop a concept of what is meant by 'learning' and encouraging them to use what they know about themselves as learners. The programme, Facilitating Effective Learning and Teaching, or FELT (Munro, 1992) affords the opportunity for them to evaluate and to modify these concept in the light of increasing knowledge and experience as learners. They are encouraged to observe and evaluate what works for them as learners and to explore new ways of learning.

The basis of the programme is an examination of the learning process by learners. The complexity and multifaceted qualities of this process are recognized and identifies several aspects of learning about which learners may have implicit knowledge. The learning experiences provide the opportunity for learners with to make this knowledge more explicit. Particular aspects of learning are examined at a time. At each time learners are encouraged to use what they already know. Gradually, as more components of learning are investigated, a model of learning is built up. The following aspects are examined.

1 **What is meant by learning ?** Students reflect on their understanding of learning . They engage in a number of simulated learning activities and following each, examine what they have learnt about learning. They reflect on their implicit models of learning and the implications that these have for how they learn and the expectations that they hold of their teachers. They analyse the different types of things they need to learn and the things that they need to do in order to learn. They analyse the conditions under which they learn, the relationship between motives for learning and the products of learning and motivation to learn. They develop an understanding how teachers teach and examine constructive things that they can do when they find learning difficult.

2 **Individual ways of learning** Students examine ways of analysing learning situations, ways in which different learners and

the concepts of multiple ways of learning and cognitive style. They investigate their preferred ways of learning, means of matching their ways of learning with instructional demands and ways of broadening their preferred ways of learning. They are encouraged to broaden their options as learners, to learn to understand and to value themselves and others as learners.

3 **How do I feel about myself as a learner ?** Students examine their self-concept as learners, its effect on learning, the role of self-talk on self concept, various strategies for learning to handle stress and anxiety in the learning situation ways of monitoring and analysing the self-talk that they use, leading to an understanding of the effect of emotional reactions on how one learns .

4 **Displaying what I know .** Students explore a variety of ways of representing what they know and what they have learnt. They investigate the importance of showing what they know, how they can make opportunities for themselves to do this, note their preferred ways of showing what they know and how these are part of their learning styles. They explore ways of broadening and improving this, the value of displaying what they know and ways of constructively making opportunities for them to show what they know. They examine the issue of using what they already know when learning a new idea.

5 **How do I learn new ideas ?** Students explore strategies for learning new ideas, for changing and synthesizing knowledge, for learning new attitudes and learning new ways of thinking. They examine the importance of questioning as a learning strategy and work on the various types of questions that they can ask to facilitate learning and alternative ways of looking at ideas they are learning. They analyse and evaluate various types of thinking and problem-solving strategies. They explore solving unfamiliar problems from different perspectives.

6 **How well do I concentrate ?** Students develop a model of concentrating, through a series of simulated exercises observe what things affect if, and explore a series of strategies that they can use to help them to concentrate better.

7 **How well do I learn by reading / writing / listening?** Students explore and monitor a range of strategies for helping them to learn by reading, writing and by listening more efficiently. The strategies in each area are linked with individual ways of learning .

8 **How well do I remember what I have learnt ?** Students work on a model of long term memory and explore various strategies for storing information that they have learnt long-term, for example, in semantic, kinaesthetic and episodic memories. They examine strategies for retrieving and remembering information efficiently. Again the focus is on individual ways of learning.

9 **Learning in different contexts.** Students explore learning ideas in different contexts, for example, by themselves, working productively with peers in small groups, working in large groups. They reflect on peer contributions to their understanding of an idea, how peers learn, how they can learn from peers and explore a range of group and co-operative learning strategies.

10 **Learning to organize one's self as a learner.** Students examine the concept of the learning episode as an essential integrating idea and reflect on issues associated with their purposes or goals for learning, setting goals and monitoring progress in learning and developing an action plan. They trial various procedures for monitoring one's learning.

The FELT approach is described in detail in a series of lesson plans in Munro (1992b). The programme makes various assumptions about learning : that

(1) knowledge is acquired through active construction or building processes involving student action and the investment of attention (Cobb, 1986; Steffe,1990).

(2) the knowledge constructed includes several components; 'cognitive knowledge' (concepts, explanations, procedures), cognitive processes (ways of learning, thinking, reasoning), affective knowledge (beliefs and attitudes about an idea, how it is learnt, and self as a learner) (Hiebert, 1986; Kloosterman, 1988).

(3) students are more likely to be motivated to learn when they believe that they can learn and have framed appropriate goals or challenges for learning (Ames, 1992).

(4) the type of knowledge constructed is influenced by the student's motives and purposes for learning and the extent of engagement in learning (Biggs & Tefler, 1987).

(5) students learn or construct knowledge by using what they already know about the topic being learnt, the learning process and themselves as learners (Fincher - Kiefer, Post, Greene & Voss, 1988; Holmes, 1984; Langer, 1984; Mudd, 1987).

(7) learning strategies are the actions or procedures that students initiate to construct knowledge; in other words, what one does to learn. Learners can add to their repertoire of strategies and, as a consequence, can improve their performance and efficiency (Ellis, Deschler, Lenz, Schumaker & Clark, 1991).

(8) learners differ in their preferred cognitive styles; this includes the strategies that they employ to construct a particular idea, the schematic knowledge that they bring to the learning situation, their

ability to process information, their level of motivation and the ways in which they allocate attention (Riding & Douglas, 1993).

The present investigation reports an evaluation of the effect of studying the first aspect of learning on students' knowledge of learning and beliefs about themselves as learners.

The Design of the Investigation

The students : 137 students in the 5, 6, 7 and 8 years levels at primary and secondary schools in the Eastern metropolitan suburbs of Melbourne.

The criteria for successful change in learners' understanding of the learning process. Change in the following areas of ability was seen as indicative of successful growth in understanding of the learning process :

(1) to identify and use various strategies involved in learning,
(2) to describe one's model of learning,
(3) to demonstrate a preference for constructivist models of learning,
(4) to describe how one goes about learning,
(5) to use a broad set of learning strategies and problem-solving strategies in an increasingly versatile way,
(6) to plan one's way through a learning task,
(7) to display behaviours consistent with taking a greater responsibility for learning and becoming more independent learners,
(8) to demonstrate an understanding and value and one's preferred ways of learning and an ability to modify these,
(9) to understand the learner-teacher interaction process,
(10 to describe and demonstrate how one might deal constructively with difficult learning situations and
(11) to display ways of using what one already knows about an idea being learnt.

The measures used. Although not adopting the traditional pretest -treatment - posttest design, the investigation involved the analysis of gains made by students as a result of learning more about learning. As a consequence, a number of measures were administered prior to and after initial involvement in the teaching programme:

(1) student self-perceptions as learners were monitored using prepared checklists and by the collection of anecdotal information in the student's classroom.

(2) student ability to demonstrate both procedural and conceptual knowledge about effective learning when cued to do so. This was examined using two techniques;

(a) group-administered tasks that directly tapped this knowledge and

(b) monitoring how individual students completed learning tasks using 'thinking aloud' techniques.

(3) spontaneous use of learning strategies in small -group learning contexts in which thinking aloud is possible.

(4) spontaneous use of previously-learnt strategies in the context of regular learning demands; this is monitored by recording the frequency of various behaviours seen as 'effective learning behaviours' in class such as, when learning a new idea, behaviours consistent with active exploration , a greater likelihood of risk-taking, of asking questions that attempt to relate the idea to students already knew, learning-oriented behaviours (fewer avoidance or procrastination behaviours, a greater likelihood of accessing one's knowledge base.

(5) students' conceptual knowledge about learning. This was collected by having students (1) sort a series of six pictures of learning metaphors in an order than showed their learning preferences and (2) discuss their understanding and beliefs about learning.

As well, a range of learning behaviours were monitored during the implementation of the programme and in regular teaching sessions. Care was taken to minimize the likelihood of the instruction intentionally eliciting the behaviours being monitored.

The teaching programme Students were introduced to the concepts of learning through a series of activities in which they explored, trialled and reflected on particular aspects of learning at a time by working. Each of the aspects of learning mentioned earlier (for example, What do we mean by learning ? How Do I Learn ? How do I feel about myself as a learner? Displaying what I know . How do I learn new ideas ? How can I go about solving problems ?) was explored and developed in turn by a class under the leadership of a teacher qualified in educational psychology. Where possible, the class's regular teacher remained in the room while the unit teacher developed each concept. Each teaching session consisted of a set of activities that focus student attention on an aspect of the learning process. Each activity was introduced as a challenge or problem. Learning activities unrelated to the students' current content areas as well as current content area learning were used as the foci of reflection. Unrelated activities were used when a need existing to manage both the amount of information to be handled and students' negative attitudes towards particular content areas. In both situations students related the ideas developed about learning to their regular learning. An example of an unrelated learning activity is learning what a 'bof' is (Munro, 1992). Students read or listened to the following information. They were told to try to discover what a bof is. As well, they were asked to think about what they did to learn about bofs.

> Peter knew enough about bofs to be aware of the danger he was in. He thought about his predicament . Bofs, he knew, were short-

sighted, but had a very good sense of smell. They also had very sensitive hearing.

In the distance he could hear the roar of the river. Would that cover the noises that he was sure to make as he tried to escape ? Slowly and silently he turned and backed away from the clearing.

The bof couldn't see Peter, but knew that he was escaping; its sense of smell told it this. It padded along on its huge paws, claws sharp and extended. It moved its head from side to side, its nose pointing up and swinging like a radar scanner searching for its target.

Peter made his way to the waterfall. He stopped on the bank of the river, keeping as still as he could.. Then he saw the bof again. It was standing on a rise that ran along the bank. It was hungry. It was also angry because it had been deprived of its dinner. It padded up and down on the green grass carpet making a soft grunting noise as it moved, It furiously sucked in air through its dilated nostrils as it searched for Peter's scent. Its huge arms thrashed around as it groped for its quarry. Suddenly its pointed ears pointed in Peter's direction.

The students worked on each task either individually or in small groups and reflected on how they went about learning. The emphasis was on students reflecting,.sharing ideas, discussing and evaluating what they did, what worked for them, what they might use in the future, etc. The teacher asked questions that challenged and directed attention to particular aspects of the learning process. The emphasis was not on 'correct answers' but on joint exploration of how people learn. Learning strategies were introduced in the context of "What about trying ... ? " The students recorded the main ideas developed in each session in formats that match their preferred ways of learning styles, for example, in written notes, posters, diagrams, flow charts, orally on tapes or in action sequences.

The students examined what the key concepts meant for them as learners and for their future learning. As much as possible, each learning concept being developed was related to the timetabled subject usually taught at that time. If this were a science lesson and aspect 4 above was being developed, students examined what they knew about a scientific topic and ways of representing their scientific knowledge. In other words, students used their existing learning contexts as 'raw data' for the analysis and reflection. This helped them to integrate the concept about learning with their general subject or content learning and to see how these concepts were relevant to their on-going learning. As well they had a focus for reflecting on and analysing their learning; they reflected on ideas that are familiar to them. Students worked together, questioning and reacting on each other's ideas, building on and adding to peer contributions.

Outcomes of the investigation

Change in students' models of learning. Changes in students' models of learning in the term following the teaching programme were investigated by monitoring (1) changes in the selection of pictorial metaphors of learning and (2) changes in verbal descriptions of how one learns.

Students ordered six pictorial metaphors of learning in terms of the extent to which each matched how they believed people learnt. Of the pictures, two illustrated 'passive learner being acted on ' models of learning, two illustrated 'active learner acting' or 'constructivist ' models of learning and two illustrated partial constructivist models. A 'learning belief' score was calculated for each order and a score range that matched passive, constructivist and partial constructivist beliefs was derived. The extent of change in learning belief (% at each grade level) is shown in Table 1.

Table 1

Change in learning belief at each grade level

Nature of change	Grade level (%)			
	5	6	7	8
Passive , no change	0	0	3	0
Passive to partial constructivist	21	9	14	12
Passive to constructivist	34	25	28	31
Partial constructivist, no change	4	11	12	12
Partial constructivist to constructivist	19	27	18	27
Partial constructivist to passive	0	0	0	0
Constructivist, no change	22	28	25	18
Constructivist to partial constructivist	0	0	0	0
Constructivist to passive	0	0	0	0

These data show the extent of change in students' models of learning following the programme. Most at each grade level showed a movement towards a more learner active constructivist model. No student showed a trend in the opposite direction.

The verbal descriptions of Year 5 to 8 students were categorized similarly in terms of whether they were based on passive, partial constructivist or constructivist models of learning means. While student models of learning were classified on the basis of an interview and not on single statements, the following statements illustrate the criteria used. Passive models were exemplified by statements such as "Things drip in / You get told things". Partial constructive models were exemplified by "I store stuff in my head / I get new ideas / I soak things up". Constructivist models were exemplified by statements such as "I put new things together in my mind / making pictures in my mind". The number of students giving each view across all grade levels (%) is shown Table 2.

Table 2

Change in learning belief at each grade level

View of learning	% of students	
	Before	After
Passive view	54	15
Partial constructivist	35	23
Constructivist	21	62

These data show a trend similar to that reported for the picture sorting task. Prior to the learning programme most of the students held either a passive learning view or a memorizing view; learning involved taking in, absorbing or retaining information. The remaining students provided a more active learning view; learning involved finding out new things, asking questions, etc. After completing the programme, most provided an action-learning view; learning involves acting on ideas, visualizing, etc.

Variation in the learning outcomes. Students collated and compared the types of ideas that they had constructed about each idea. For 'bofs', for example, they noted that their learning outcome ranged from a 'listing answer' ("A bof has pointed ears, a keen sense of hearing, ... etc. ") to 'bof is like a answer' ("A bof is a sort of bear a huge orang utan .....) The outcomes were represented as lying at opposite ends of a continuum. At one end the bof is described in terms of its criterial features without reference to related concepts while at the other end the concept is defined in terms of related concepts. The descriptions that involve an interpretation of separate listed features, (a bof is a scary creature, a predator) occupy an intermediate position.

The fourth type of answer (that a bof is a figment of the writer's imagination, an irrelevant character, a concept that has been invented to illustrate particular aspects of learning or make believe (from year 7 student)) doesn't fit

easily on this continuum. The proportion of each type of answer given by the Year 7 students is shown in Table 3

Table 3

Frequency of each type of learning outcome (% of Year 7 students)

Type of answer	% of total
restatement of given data	46
some interpretation of given data	18
given data is related to what one knows	33
a bof is make believe, etc.	3

The students at each level nominated a range of issues associated with this difference in outcomes that they then examined. The issues identified by the Year 7 students were as follows;

(1) whether all of the answers are 'correct' and what 'being correct really means.

(2) while all of these types of answers may be 'correct they differ in quality. Why did different students build different impressions of a bof ? How students vary in what they did to learn about bofs ?

(3) what this might mean for regular learning ? How do students differ in the way in which they learn things ? When is each of these types of learning is appropriate ? Do students' motives, reasons or purposes for learning affect this ? How likely is it that a particular student to engage the one type of learning across a range of subject areas ? Is a student who finds that mere paraphrasing or 'regurgitating' what has been learnt in one subject or area leads to satisfactory feedback likely to learn in this way in other areas ? How do teachers let students

know the types of learning outcomes that they think is necessary at any time ? How useful would it be for them to do this type of activity often when they are learning ?

Awareness of the learning strategies or 'learning actions' students used to learn. Groups of students collated lists of actions that they used to learn. Initially students displayed a reluctance to engage in this discussion. This reluctance increased with grade level, with proportionately fewer students ay Year 8 than at Year 5 being prepared to discuss what they had done. Most students found it difficult initially to describe how they do about learning and the learning actions that they use.

Subsequent discussion indicated that they needed to learn both how to reflect on their learning and how to talk about their reflections. Because they hadn't done this type of activity much in their past, they believed that they lacked the necessary words. They also lacked self-confidence about doing it, that they are being asked to talk about issues that are more personal and private. This reluctance diminished as students were presented with recognition - type cueing questions and provided with supportive feedback.

In relation to learning what a 'bof' was, for example students reported

(1) needing to guess and then try out and experiment with the guesses, take risks.

(2) trying to decide how a bof was like the animals that they already knew about.

(3) making mistakes and then trying to correct these errors.

(4) being prepared to change their mind about an idea as they worked on the task.

(5) asking themselves questions about the information, for example "What does this tell me?"

(6) talking about the ideas to themselves in different ways.

(7) trying to make a picture of what they were reading.

(8) needing to go over the ideas two or three times, trying to put ideas together in different ways, trying to see things from a different perspective.

(9) scanning the text before beginning to read it in detail , trying to make decisions about the overall theme of the ideas, the general orientation.

(11) needing to discuss what a bof was with others.

(12) break the ideas into smaller parts and work on each part at a time, eliminating alternatives, separating the relevant from the irrelevant information, focussing on key words.

From the range of learning activities students found it useful to develop and maintain their own ground rules for learning. Students discussed the advantages of reflecting about how they learnt. The statements exemplify the most frequent values identified across the year levels;

(1) "When you know there are things that you can do (to learn) and you what these things are, you can control your own learning better. "

(2) "You know you need to do things to learn; you don't learn by just sitting back."

(3) "You can do different things at different times / in different situations."

(4) "You can see how useful each one is "

(5) "You can see what other kids do in certain situations and try what they do yourself".

(6) "When you find something hard to get started, you can try other things."

Procedural knowledge about effective learning Student ability to demonstrate procedural knowledge about effective learning when cued to do so was examined using two techniques;

(a) group-administered tasks that directly tapped this knowledge and

(b) monitoring individual student performance when engaged in learning, particularly using 'thinking aloud' techniques.

The mean performance on each learning behaviour (proportion of students demonstrating this behaviour) before and after involvement in the programme was measured. Mean performance increased for all learning behaviours targeted. The extent to which this knowledge changed across all grade levels was examined using the t-test for repeated measures and is shown in Table 4 , with the level of significance of the change noted.

Table 4

Gain in demonstrated procedural knowledge of effective learning (N = 137)

Learning Behaviour	level of significance (p value)
Describe one's model for learning	<.01
Specify their ground rules for learning	< .01
Describe strategies for learning a new idea	< .001
Specify short-term and episode goals	< .01
Write an action plan for a learning task	< .01
Use techniques to access one's existing knowledge such as drawing a semantic map, brainstorming using key words or formulating a set of questions	< .001
Ask questions that extend the learning of an idea being learnt	< .01
Demonstrate effective listening strategies	< .01
State actions that they might take when an idea is difficult to learn	< .001
Suggest a sequence of questions that will guide the student through solving a problem or completing a task.	< .01

These data support the prediction that students, when cued, demonstrated an improvement in their knowledge of a range of effective learning strategies. The extent to which these strategies were used spontaneously in regular learning is examined in the following section.

Spontaneous use of procedural knowledge about effective learning The frequency with which students used learning strategies spontaneously in the term after completing the unit was observed by monitoring how students responded, without being cued, to sets of typical learning tasks in their regular classes. The learning tasks were

(1) learning new ideas by participating in an oral presentation

(2) learning new ideas by reading a passage

(3) solving an unfamiliar problem and

(4) completing a written project.

Two observers noted the extent to which students displayed behaviours consistent with effective learning. Students displayed a greater range of outcomes associated with effective learning:

(1) When learning a new idea, students were more likely to display behaviours consistent with active exploration, more likely to take risks to ask questions that suggested thoughtful guessing, (for example, Is it like .... ? Do you mean that ..... ?).

(2) They were more likely to display learning-oriented behaviours (fewer avoidance or procrastination behaviours, quicker 'coming to terms with the task' and less "What do we have to do ?", a greater likelihood of accessing one's knowledge base. They were more likely to plan and to develop an effective action plan.

(3) They were more likely to ask questions that attempted to relate the idea to what they already knew, to draw a semantic map or use other brain-storming techniques.

(4) They were more likely to invent their own ways of working through a task and were more aware of the options that they had for learning an idea (they could draw a picture, read aloud to themselves, talk about it, etc), to use a range of ways of displaying what they know,

(5) They were more likely to use alternative ways of consolidating their knowledge and to engage in interactions with teacher and peers in learning situations, not only to ask questions but also to discuss.

Students were able to take a particular content and examine it from different perspectives.

Student self-perceptions as learners Student self-perceptions as learners were monitored both by using prepared checklists prior to and in the term after the completion of the programme and by the collection of on-going anecdotal information in the student's classroom. The major qualitative changes reported by students included the perceptions that

(1) they could be more in control of their own learning, that they could manage their own learning, that there were things that they could do when learning was difficult, that they had options, that they could plan and realize their goals.

(2) they could trust what they already knew about ideas that they were learning and that they could build on this.

(3) when they couldn't understand an idea at one time, this didn't mean that they would never be able to understand it , that you could understand 'part' of an idea and that it often helped to note the part that you did understand

(4) they were 'allowed' to do various things when they learnt. Many students reported changes in perceptions consistent with the belief that particular learning behaviours and beliefs were 'legitimized' or 'OK'. It seemed that in many cases it was not that teachers had said that students couldn't use particular learning actions, it was just that teachers hadn't overtly condoned them. Risk-taking behaviours, guessing, making a picture in one's mind, changing one's mind when learning were examples of these actions.

(5) they could 'stand back' or 'look down' and see what worked for them and then use that action sequence again. Many of the students had not previously examined monitoring what they were doing to learn,

seeing how well it worked for them and then deciding if and when they might use it in t he future. That they could actually do this and that it could help them to learn better in the future surprised many students.

(6) there were useful, functional steps to take in classes and learning situations in which they found the teaching ineffective for them. The notions that they needn't feel alienated from the idea, that they could try to decide why they found the learning difficult, that there were things that they could do when their approach to learning clashed with the teaching style was noted. Several students at all year levels reported learning the awareness that, even if they found teaching difficulty at one time they might 'learn more of it a bit later'. They reported finding it useful to experiment with the types of questions that they could ask of the teacher to obtain clarification, for example, questions such as "Do you mean ..... ? (and then paraphrase what was said by the teacher) or "Is this idea like ..... ? (areas of knowledge with which the student was familiar.

The process by which student self-perceptions changed indicated the individual nature of the process and the effect of this change on the subsequent learning of individual students. These data were collected anecdotally as the unit progressed. Relative to a particular idea being raised in the teaching, students differed in terms of when they reported it as a self-perception. Processes such as different approaches to learning or cognitive styles, different self-concepts as learners and different knowledge bases for a content area seemed to influence the time at which particular students reported a self-perception. Given the consequent influence of the self-perception on the subsequent learning patterns of students, this process merits further research analysis.

Student perceptions of the effectiveness of the programme.
While student perceptions of the programme as a whole and of the understanding learning component of it was ultimately positive, it is

important to note that some students at each year level found the approach to learning anxiety-arousing. A proportion that increased with year level reported initially feeling threatened. The sources of the perceived threat and anxiety were (1) an emphasis on questions (2) a lack of familiarity with this approach to learning (3) the encouragement to describe how they went about thinking and learn or why they held particular beliefs (4) the emphasis on self-questioning rather than on 'being told' threatening initially (5) being asked to 'carry around unanswered questions'; these students expected immediate answers to questions and feared ending a lesson still with unanswered questions.

These sources of perceived threat were due in part to a clash between students' initial models of learning and their expectations of what constitutes classroom learning and teacher behaviours. They highlight the need for students to understand the approach being taken to learning and teaching at any time and the importance of taking account of implicit beliefs about learning.

Exceptional learners, both those referred to 'gifted' and 'learning disabled' reported strong changes in self-perception and a valuing of the focus on learning. Students in both groups expressed a valuing of the notion of matching the teaching with how students go about learning and things that they can do to achieve a closer match. The findings support the claim that when 'learning disabled' students learn how to learn in particular situations, to understand the learning process and themselves as learners, when they learn to use self-instruction strategies, and when their teaching matches how they learn, their academic ability improves significantly. Some of the so-called 'gifted and talented' students who had become bored and frustrated with classroom learning found it useful to have their 'self-drive' and motivation acknowledged. Previously they had found it difficult to learn in situations in which their learning is directed externally and in which their curiosity is not challenged. They noted that the focus on reflection of how one learns, on self-directed learning, on transferring and generalizing their knowledge, on relating ideas in unfamiliar ways, benefitted them. The

irritation with class peers who do not understand the ideas at the same depth and who appear to have difficulty understanding and valuing the learning of others could now begin to be dealt with in a genuine way.

Conclusion

The present investigation has examined the issue of whether helping students to increase their understanding of the learning process impacts on their beliefs about how they learn and their learning ability. The investigation examined one aspect of a much broader learning programme. Particular gains were observed in how students went about learning, their understanding and valuing of themselves and others as learners and their ability to reflect on or contemplate how one learns and one's learning base. This area of study is expected to develop further. Important issues for teachers and educational policy makers relate to how these types of learning opportunities may be incorporated in curricula and in school policy in the future.

The aspect of learning examined in this investigation is part of the FELT programme. The programme is intended to provide schools with one of many possible options for improving knowledge and attitudes in this area. Similar programmes will no doubt develop. The notions of legitimizing a joint exploration of the learning process by students, parents and teachers, making use of the existing knowledge bases of students, and of providing opportunities for up-dating these with additional data are seen as critical. Encouraging and demonstrating practically a valuing and understanding one's own preferred ways of learning and providing opportunities for reflecting on ways of broadening it, are foundations. Understanding and valuing how others learn is also important

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